UPPER MONUMENT CREEK EIS
FIRE/FUELS MANAGEMENT SPECIALIST REPORT

Prepared by: Eric Zanotto/Amanda Disman

Background

The 70,600 acre Upper Monument Creek (UMC) project is located within the Pikes Peak Ranger District on the Pike National Forest in Colorado. From 1910 to current times, suppression of both lightning and human caused fires has been the central focus on National System Forest lands, which has effectively modified the fire regime in many areas. The UMC project area is a reflection of this suppression effort as only two fires have influenced the structure and development of the landscape over this time. Fire suppression has not only modified the natural fire regime of Front Range forests, but it has also significantly affected the distribution and structure of forest vegetation. As recent wildfire evidence proves, current forest vegetation conditions are capable of carrying uncharacteristically large and severe wildfires that negatively affect the integrity of ecological and social systems. The UMC project seeks to address these concerns by restoring forest vegetation to conditions that are more representative of historic patterns that were resistant and resilient to the influences of fire.

Proposed Treatments

The Upper Monument Creek Landscape Restoration Initiative proposes to treat approximately 31,700 acres of forested land within the larger 70,600 acre Upper Monument Creek project area for the purpose of improving forest health, reducing wildfire hazards, and protecting water resources. Forest treatments will be implemented using a variety of techniques, including mechanical removal, mechanical non-removal, and prescribed fire (Figure 1).

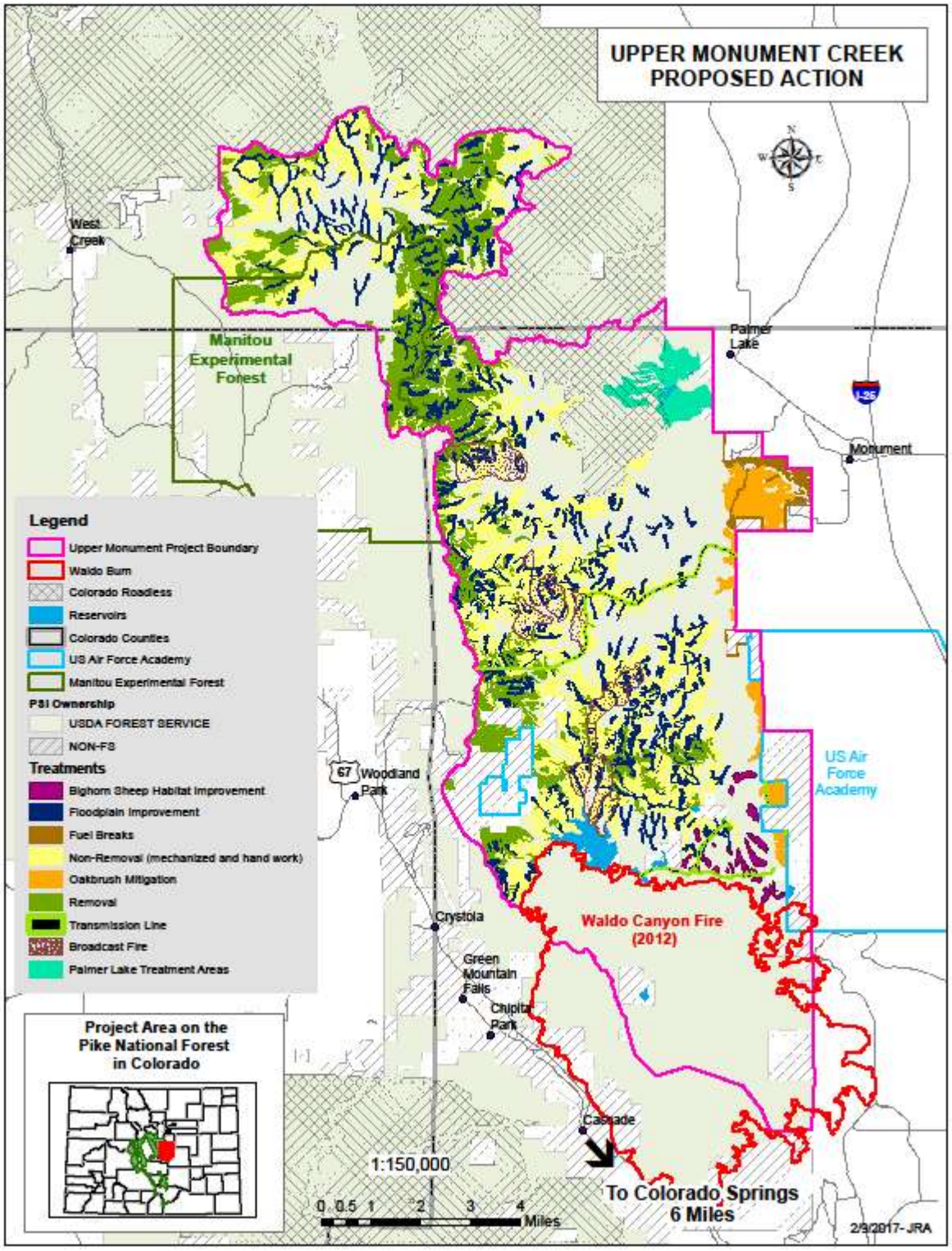

Figure 1. Proposed treatments within the Upper Monument Creek project area.

Methodology

This document describes results of analysis conducted to evaluate potential effects of treatments on modeled wildfire behavior. Fire behavior was modeled using FlamMap 5.0 (Finney 2006), with fuels and vegetation data provided by LANDFIRE (Rollins 2009). Fuel moisture and weather variables representing 90th percentile conditions were used as model inputs (Table 1). Values represent 90th percentile conditions averaged from May 1 to September 30 (to represent the wildfire season) using data from 1990 to 2015 at the Polhemus and Manchester Remote Automated Weather Stations (RAWS). Polhemus data were given a weight of 65% and Manchester data were weighted at 35%. A wind speed of 25 mph blowing from the southwest (220°) was used. Model outputs included crown fire, flame lengths, and spotting distance.

Table 1. Fuel moisture and weather parameters used in FlamMap. Data were synthesized using Fire Family Plus software.

Variable	90th Percentile Condition
1-hr fuel moisture (%)	2
10-hr fuel moisture (%)	6
100-hr fuel moisture (%)	9
Herbaceous live fuel moisture (%)	30
Woody fuel moisture (%)	68
Air temperature (F)	81

LANDFIRE data was adjusted in ArcFuels to represent treatment effects (Table 2). Adjustment factors for canopy cover, canopy base heights, canopy heights, crown bulk densities, and fuel models were based on similar values provided in Vaillant et al. (2013) and Ager et al. (2014). Original values are multiplied by the adjustment factor in order to approximate post-treatment conditions in the model input variables. Abbreviations are as follows: CC = canopy cover (%); CBH = canopy base height (m); CH = canopy height (m); CBD = canopy bulk density (kg m^{-3}); FM = fuel model (post treatment).

Table 2. Adjustment factors for different treatment types in the Upper Monument Creek landscape.

Treatment Type	CC	CBH	CH	CBD	FM
Removal/Thinning/Fuelbreak	0.4	1.8	1.2	0.3	TL1 (181)
Non-removal	0.6	1.4	1.0	0.6	SB1 (201)
Oakbrush	0.8	1.0	1.0	0.8	GR2 (102)
Prescribed fire	0.9	1.2	1.0	0.9	GR2 (102)

Alternative 1 (No Action): Fire

Direct and Indirect Effects

There are no direct effects of choosing the no action alternative.
Recent wildfire activity on Pike National Forest lands (Hayman 2002, Waldo 2012) have demonstrated the risks that current forest conditions pose to communities and homes within the Front Range. A comprehensive analysis of a no action alternative indicates that the current conditions will continue to perpetuate in the absence of forest management (Low unpublished). Left untreated the Upper Monument Creek analysis area would continue to develop under current trajectories with a high potential for large-scale disturbance by fire.

Alternative 2 (Modified Proposed Action): Fire

Direct and Indirect Effects

-Proposed treatments reduced the potential for active crown fire (Figure 2). Projected crown fire decreased from 29,600 acres prior to treatment to 16,857 acres after treatment. Areas that remain in active crown fire condition represent those areas that cannot be effectively treated due to terrain and inaccessibility (Figure 3). Projected surface fire increased from 16,137 acres to 24,005 acres as a result of treatment.

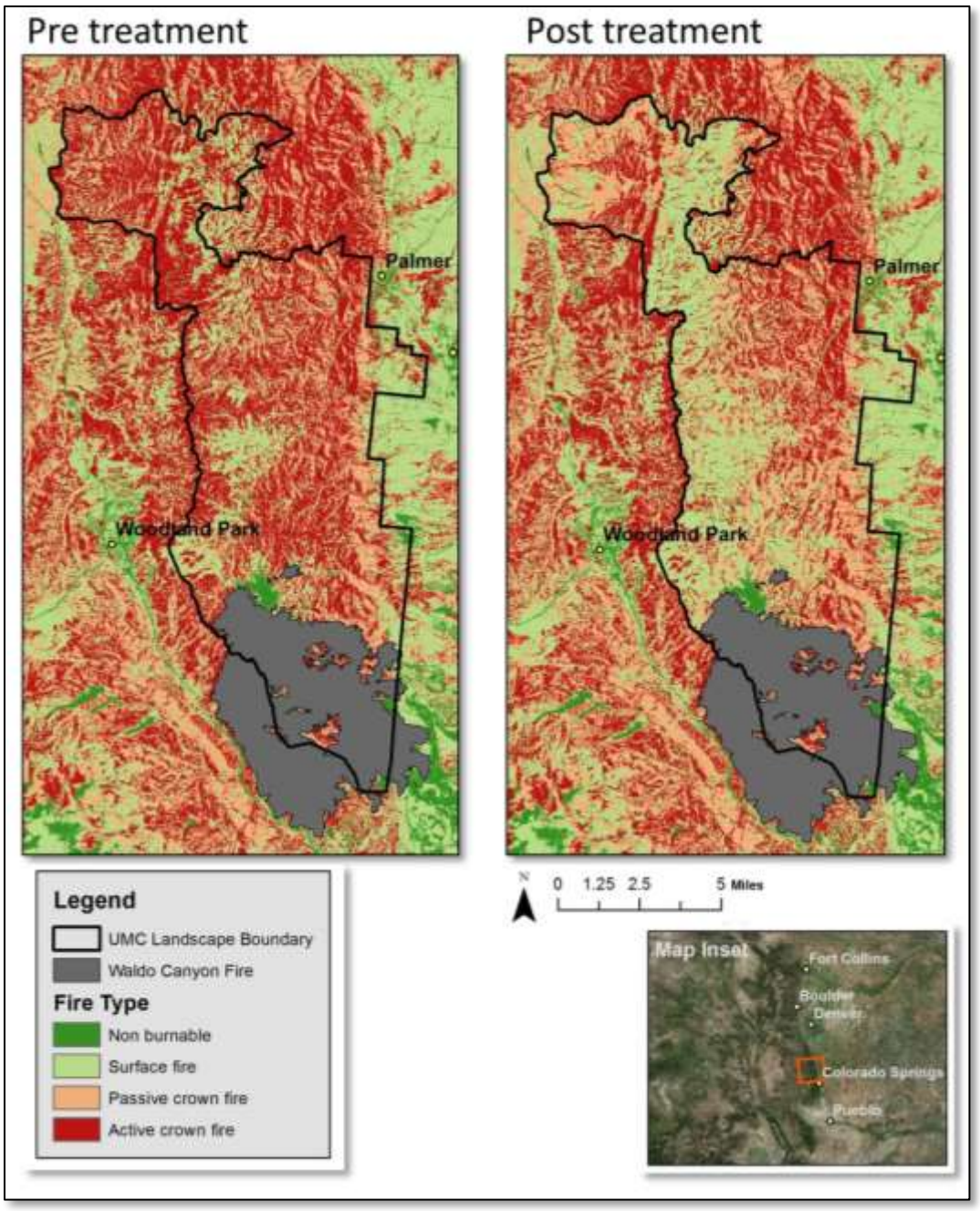

Figure 2. Change in active crown fire from pre to post treatment.

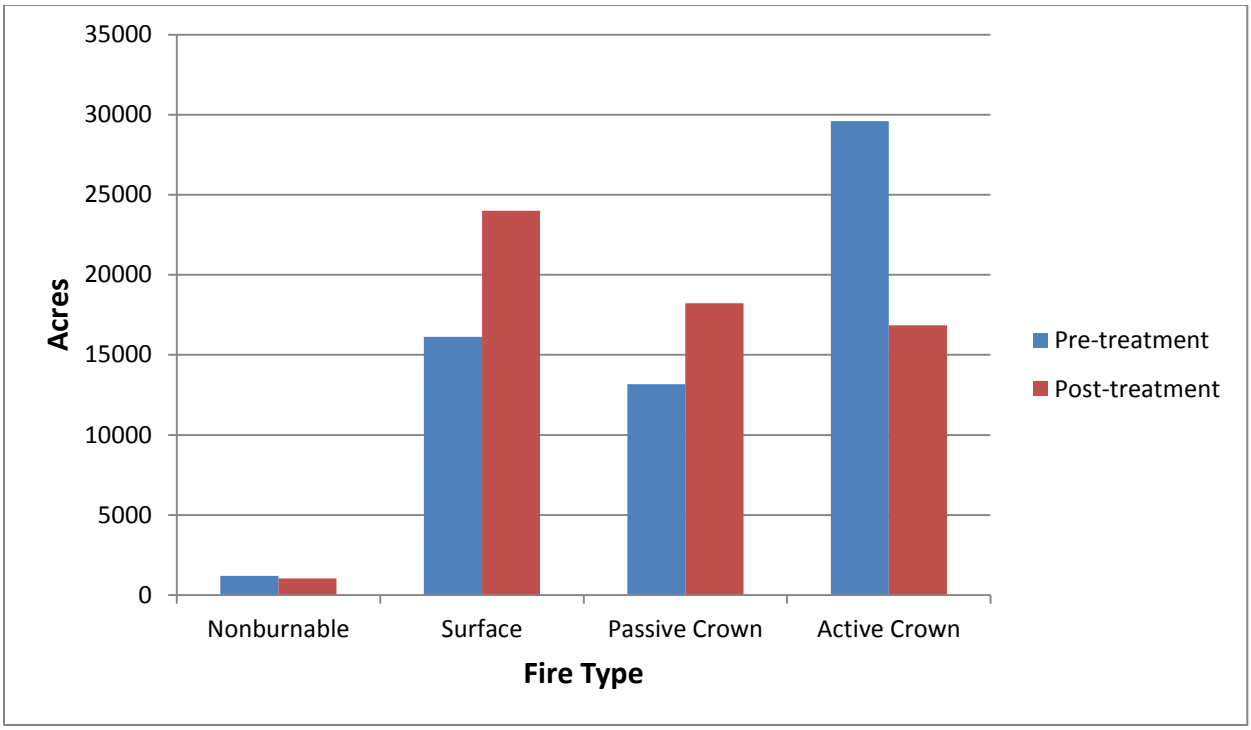

Figure 3. **Change in fire behavior due to treatment in the Upper Monument Creek landscape.**

-Proposed treatments reduced flame lengths (Figure 4). Acres projected to burn with flame lengths greater than 12 feet decreased from 42,127 to 31,045 acres as a result of treatments. Similarly, acres projected to burn with flame lengths less than 4 feet increased from 13,757 to 21,802 due to treatment. Reducing flame lengths to less than 4 feet is an important outcome of treatments, as lower flame lengths provide fire fighters with tactical advantages for fighting wildfire.

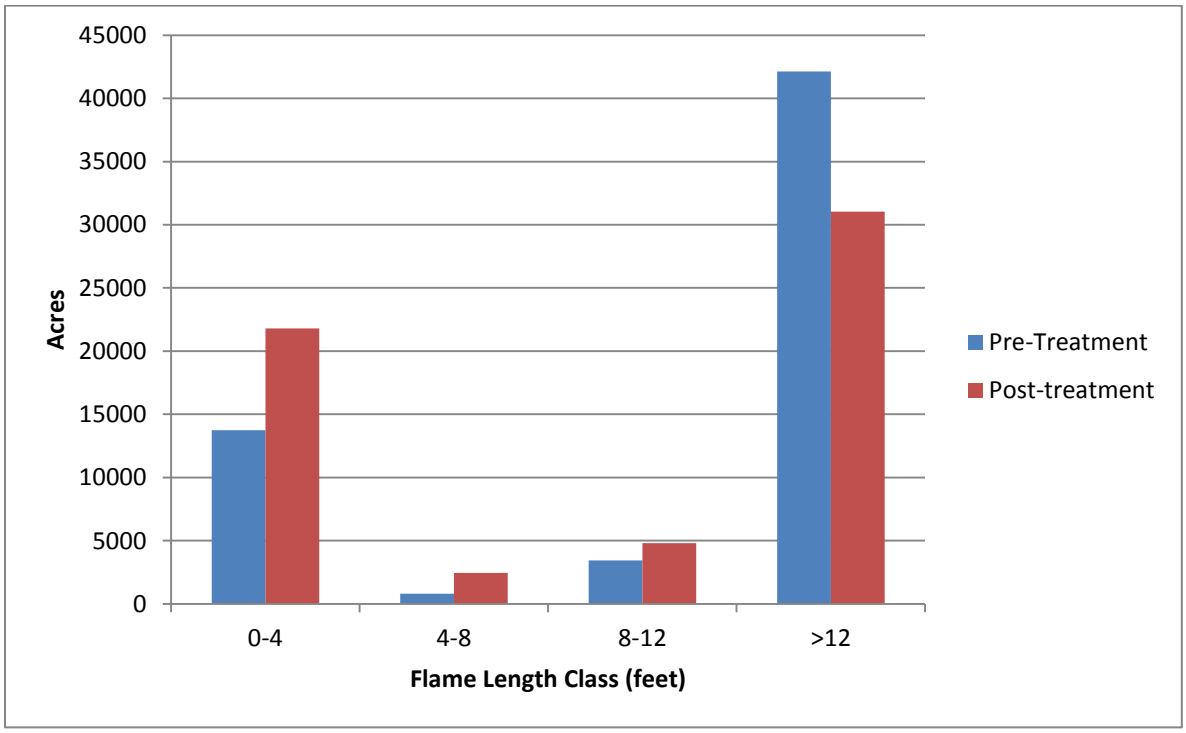

Figure 4. Change in flame lengths due to treatment in the Upper Monument Creek landscape.

-Fire spread is facilitated by embers spotting to unburned areas ahead of the flaming front. Maximum projected spotting distance of fire decreased as a result of treatment as well (Figure 5). Prior to treatment, 36,640 acres exhibited spotting distances of more than a quarter mile whereas after treatment 29,235 acres exhibited spotting distances of more than a quarter mile.

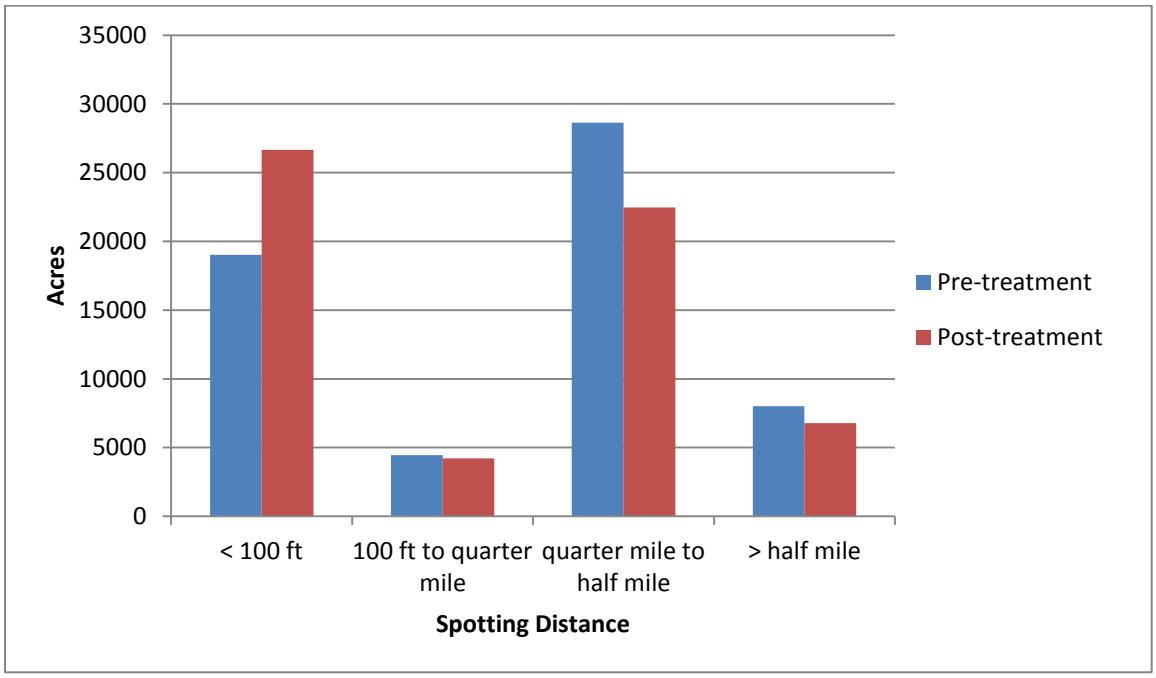

Figure 5. Change in spotting distance due to treatment in the Upper Monument Creek landscape.

References

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